muſt naturally be very different. Here are no accumulations aloft. The quantity ready for a diſcharge downward is vaſtly leſs, and the paſſage narrow and contracted; and by the almoſt conſtant motions of air, were there more ſupplies it would ſoon ſhut up. Beſides there is little aptneſs to flow from ſurrounding regions by reaſon of the ſmallneſs of their depth, &c. And yet ſo great is the ſpecific weight of what deſcends, that the firſt aſſault has been known to equal the greateſt violence of the proper hurricanes in their moſt powerful moments.

N° XLI.

The whole Proceſs of the Silk-Worm, from the Egg to the Cocon; communicated to Dr. JOHN MORGAN, *Phyſician at Philadelphia, in two Letters from Meſſrs* HARE *and* SKINNER, *Silk Merchants in London, July* 27, 1774, *and February* 24, 1775.

Read July 8, 1775. IT is ſome time ſince we were honored with your eſteemed letter of 27th September laſt. We ſhould not have delayed ſo long acknowledging its receipt, if it had been in our power to have ſent you before this time the manuſcript you will receive herewith; but it is only lately we have been able to procure it from one of the firſt houſes in Italy. It contains an exact account of the Italian moſt improved method of making raw ſilk. We flatter ourſelves it may prove of ſome ſervice to your new eſtabliſhed manufactory, for whoſe uſe ſolely we ſent for it to Italy.

The large quantity of raw ſilk that continually arrives from China every year, being moſtly of a round or large ſize, will a good deal interfere with the ſale of yours, provided

provided you make it of the ſame; therefore we by all means recommend your reeling yours of the fineneſs of five to ſix cocons, no coarſer at any rate if avoidable. And we further beg leave to recommend your giving orders to your workmen to be extremely careful in aſſorting the ſilk, obſerving that all that is put into one parcel be exactly, if poſſible, of the ſame fineneſs; for if it is not, it will very much prejudice its ſale; a neglect in this particular is complained of in all the ſilk that has hitherto been received from America. If the ſilk, which was very good in itſelf that we received from Georgia, had been properly aſſorted, we certainly ſhould have ſold it 1/6 or 2/. per *lb.* better than we did. If you reel your ſilk fine the China ſilk rather promotes its ſale than otherwiſe, as it is neceſſary to have fine ſilk to work up with that of China.

We ſhall at all times be very ready to communicate to you any intelligence in our power.

We are, with reſpect,
Sir,
Your moſt obedient ſervants,
HARE & SKINNER.

CHAP. I. *Of the Silk-Worm.*

THE perſon who purpoſes raiſing a quantity of ſilk-worms, and preſerving good eggs, muſt begin a year before hand. He muſt chooſe a certain number of good cocons, or ſilk cods, the ſuperficies of which, he ſlightly pierces with a needle and thread and ſtrings them by ſcores; which done, he hangs them up in a convenient room, this being the moſt proper poſition for them. After the moths or butterflies contained in the cocon, have eaten their way through their natural incloſure, (which is generally about four days after the cocon is finiſhed*) you may

* It happens ſometimes the butterfly is longer before its birth, i. e. from 15 to 30 days if the weather is chilly. They generally come out in the morning.

may place them on a linen cloth diſpoſed vertically, as againſt a wall, or on a line, &c. where they couple and are joined during twenty-four hours. This over, the female lays her eggs during other twenty-four hours; after which ſhe dies, as does the male; this their ſecond life, if I may be permitted the term, is only of forty-eight hours duration. When the eggs are new laid, they are about the bigneſs of a common pin's head, and of a ſtraw colour; by degrees they become black, aſſume more ſolidity, loſing at the ſame time part of their bulk.

When they are arrived at this point, you muſt ſeparate them from the cloth; to effect which, you muſt dip them into a large pan filled with one half water and the other half wine, rather more than lukewarm; when your cloth has ſoaked in this liquor a little while, you may ſeparate them from the cloth with a ſilver ſpoon and dry them in a ſunny place, and take them away when they begin to be whitiſh.

When you have thus detached your eggs, you muſt keep them till the next year in a cool damp place to preſerve them from hatching during the great heat, which would ruin the project.

On the arrival of the ſpring, you muſt obſerve when the mulberry tree begins to put forth its leaves, which muſt be your ſignal to expoſe your eggs in a very warm place, that they may all hatch at once, otherwiſe they would only hatch by little and little, and in proportion as each individual would be arrived at the point of its natural maturity. In which caſe the pains required to ſeparate their different claſſes would be exceſſive, not to ſay impoſſible. To hatch your eggs you muſt carry them about you nine or ten days, keeping them in your boſom, or other parts near the body; in the night you may put them between the matraſſes of the bed. You may likewiſe hatch them by the heat of an oven, but this method is dangerous, becauſe you may poſſibly burn the worm

contained in the egg, and thereby deſtroy all your future hopes.

II. The worm is entirely black at its birth, and is about as long as an ant. He is rolled up in the egg, which otherwiſe could not contain him. He preſerves this black colour eight or nine days. After your worms are hatched you muſt put them on wicker ſhelves, which are covered firſt with paper and afterwards with a bed of the youngeſt and moſt tender mulberry leaves; you may place ſeveral ranges of them in the ſame chamber, one above another, provided you leave at leaſt a foot and a half between each range; that the ſcaffolding be in the middle of the room, and that your wicker ſhelves be not too broad, but juſt ſo as to reach on each ſide conveniently to the middle. By degrees the worm grows and requires more room. It muſt be your care to thin them, and keep thoſe of the ſame ſize as near as you can on one row; for which reaſon you muſt always leave ſome ſhelves vacant for that purpoſe.

The worm continues feeding during eight days after its birth, at the end of which he has three lines in length or the fourth part of an inch. He is then attacked with his firſt ſickneſs, which conſiſts in a kind of lethargic ſleep for three days together, during which ſpace he changes his ſkin, ſtill preſerving the ſame bulk.

This ſleep being over, he begins to eat again during five days, at which term he is grown to the ſize of ſeven lines in length, after which follows a ſecond ſickneſs*, in every reſpect like the former. He then feeds during other five days, and is now about nine lines in length, when he is attacked with his third ſickneſs; which over, he continues to eat again five days more, which are followed by his fourth ſickneſs, at which time he is arrived at his full growth, i. e. about fourteen lines in length and two in diameter.

He

* You muſt obſerve that theſe ſickneſſes are much longer, and laſt ſeven or eight days when the weather is cold.

He then feeds during five days with a moſt voracious appetite; after which he diſdains his food, becomes tranſparent a little on the yallow caſt, and leaves his ſilky traces on the leaves where he paſſes; theſe ſigns denote that he is ready to begin his cocon.

You muſt then furniſh him with little buſhes of heath, broom or other like twigs, ſticking the bundles upright in rows between the ſhelves, and forcing them a little that they may not fall; he remains ſtill two days to climb up the twigs, and ſettle himſelf on a good place, after which he begins to lay the foundation of his lodge, and is five days in ſpinning his cocon. He remains generally about the ſpace of forty-ſeven days.

III. You muſt keep your worms in a dry place, ſheltered and ſhut up cloſe, provided it be not too hot. If the weather be cold you muſt make a ſmall fire. When you furniſh them with leaves, take great care that they be thoroughly dry and ſtrew them lightly over your worms. You muſt obſerve to take away their dung very frequently. When the worms are ready to mount (in order to ſpin) if the weather be ſtifling hot attended with thunder, you will ſee them in a languiſhing condition; your care muſt then be to revive them, which is effected thus.

Take a few eggs and onions and fry them in a pan with ſome ſtale hog's lard, the ranker the better, and make pancake; which done, carry it ſmoaking hot into the room where they are kept, and go round the chamber with it. You will be ſurprized to ſee how the ſmell revives them, excites thoſe to eat who have not done feeding, and makes the others that are ready to ſpin, climb up the twigs.

Theſe little creatures require a great deal of care in the management; one or other muſt attend them day and night; you muſt be very dexterous and gentle in handling them; and, as I may ſay, the whole ſucceſs depends on the care you obſerve and pains you take in rearing them.

The worms cannot ſuffer ſtrong ſmells, ſuch as tobacco

and the like, for which reaſon you muſt avoid offending their delicate organs.

In many parts of Italy, amongſt others Romagna and La Marche of Ancona, they have two ſilk racoltas, or harveſts. They keep the eggs in very cool places, and when the mulberry tree begins to bud again (for during the racolta it is ſtripped of its leaves for food for the worms) they expoſe their eggs to hatch. Sometimes they give roſe leaves to the young worms, when there are no young mulberry leaves. The cocons of this ſecond racolta are rather inferior to thoſe of the firſt. The ſilk worm is generally fourteen lines in length and two in diameter and ſix and two-ſevenths in circumference. He is either of a milk or pearl colour or blackiſh: theſe laſt are the beſt. His body is divided into ſeven rings, to each of which are joined two very ſhort feet. He has a ſmall point like a thorn, exactly above the anus. The ſubſtance which forms the ſilk, is in their ſtomach, which is very long; wound up as it were on two ſpindles and ſurrounded with a gum, commonly yellow, ſometimes white, not often greeniſh. When the worm ſpins his cocon, he winds off a thread from each of his ſpindles, and joins them, afterwards, by means of two hooks which are placed in his mouth; ſo that the cocon is compoſed of a double thread. Having opened a ſilk worm you may take out the ſpindles which are folded up in three plaits, and on ſtretching them out and drawing each extremity, you may extend them to near two ells in length. If you then ſcrape the thread ſo ſtretched out with your nail, you will ſcratch off the gum, which is very much like bees-wax, and performs the ſame office to the ſilk it covers, as a gold leaf does to the ingot of ſilver it ſurrounds, when drawn out by the wire-drawer; the ſilk then remains of a pearl colour. This thread which is extremely ſtrong and even is about the thickneſs of a middling pin.

Three things very remarkable in this inſect, are,

1. They

1. They deſcribe a ſemicircle in eating.

2. Their excrement has perfectly the form of a mulberry.

3. They have no ſex before their metamorphoſis.

CHAP. II. *Of the Cocons.*

I. IT is almoſt a general rule to wait ſix or ſeven days after all the cocons ſeem to be formed, before you take them off the boughs in order to give the worms time to bring them to perfection. It is then proper from that time to give ſome air to the room in which you have kept them, in order to diſſipate a conſiderable dampneſs which the worms exhale on their mounting, (when they have not been well fed and kept, for when they have been properly nurſed this dampneſs is not to be found) and which is of great detriment to the cocons, either by rotting them, rendering them ſoft, or covering them with ſpots.

The cocons may be divided into two general claſſes, the white and the yellow, in the yellow you meet with all the ſhades from a bright yellow diminiſhing at laſt to white, ſome few are of a pale green. We reckon nine ſorts of cocons, viz.

1. The good cocons are thoſe which are brought to their perfection, ſtrong and little, and not at all ſpotted.

2. The pointed cocons are thoſe, one of whoſe extremities riſes up in a point. After having afforded a little ſilk, the point, which is the weaker part, breaks or tears, and it is impoſſible to continue winding that cocon any longer, becauſe when the thread comes round to the hole it is of conſequence broke.

3. The cocalons are a little bigger than the other, yet they do not contain more ſilk, becauſe the contexture is not ſo ſtrong. In winding they are to be ſeparated from the reſt, becauſe they require to be wound in cooler water, otherwiſe they furze out in winding.

4. The

4. The dupions, or douple cocons, are ſo called becauſe they contain ſometimes two and ſometimes three worms, who have jointly formed one ſingle cocon. They interlace their threads, for which reaſon they are to be kept aſunder from the reſt; they make the ſilk we call dupions.

5. The ſoufflons are cocons very imperfect, whoſe contexture is looſe, ſometimes to that degree that they are tranſparent, and bear the ſame proportion to the others, as a gauze to a ſattin. Theſe cannot be wound.

6. The perforated cocons are ſo called, becauſe they have a hole at one end, for which reaſon they alſo cannot be wound.

7. The calcined cocons are thoſe whoſe worm, after the formation of the cocon, is attacked with a ſickneſs which ſometimes petrifies it, and at others reduces it to a fine white powder, without in the leaſt endamaging the ſilk; on the contrary, theſe cocons produce more ſilk than the others, becauſe the worm is conſiderably lighter. They are to be diſtinguiſhed by the noiſe the petrified worm makes when you ſhake the cocon. In Piedmont they ſell for half as much again as the others. It is very rare to ſee a parcel of 25 *lb.* of them at a time: 63 *lb.* of theſe cocons have produced 1 *lb.* 1 *oz.* of fine ſilk of five to ſix cocons.

8. The good choquette conſiſts in thoſe cocons whoſe worm dies, before he has brought it to its perfection. They are to be known by the worms ſticking to one ſide of the cocon, which is eaſily to be perceived when on ſhaking it you do not hear the chryſalis rattle. Theſe cocons are of as fine ſilk as the others, but they are to be wound ſeparately becauſe they are ſubject to furze out, and the ſilk has not ſo bright a colour, neither is it ſo ſtrong and nervous.

9. The bad choquette is compoſed of defective cocons, ſpotted or rotten. They wind many of theſe cocons together. It makes a very foul bad qualified ſilk of a blackiſh colour.

II. To

II. To know whether a cocon be good or not you muſt obſerve if it be firm and ſound, or not, if it has a fine grain, and if the two ends are round and ſtrong. The cocons of a bright yellow yield more ſilk than the others, becauſe they contain a greater quantity of gum; but the advantage accrues to the winder only, becauſe all this gum is loſt in the dying. For which reaſon, as well as for certain colours they take better, the pale ſilks are preferred, becauſe having leſs gum they loſe leſs in boiling.

In the number of cocons that are bought, there ought to be neither ſoufflons, nor perforated cocons; becauſe the ſeller is obliged to keep them apart and to ſell them as ſuch; notwithſtanding which, you may always reckon on half profit of theſe ſorts that remain with the others, and if to theſe you add the dupions and choquette, you may calculate them at ten per cent.

The cocons of the mountains are better than thoſe of the plain; there is a greater quantity of white amongſt them. 'Tis true they are not ſo large as thoſe of the plain, but the worm, at the ſame time, is proportionably leſs. The reaſon of which is, that the air of the mountains being ſharper, the worm labours with greater vigour. They ſucceed, likewiſe, better in the dry plains than in the damp and marſhy parts, becauſe the leaf is more nouriſhing. Five or ſix days after the cocon has been detached from the branches, it is your buſineſs to prevent the birth of the worm, who would, otherwiſe, pierce through the ſhell, and thereby render the cocon uſeleſs. To prevent which you muſt put your cocons in long ſhallow baſkets, and fill them up within an inch of the top. You then cover them with paper and a wrapper over that. Theſe baſkets are to be diſpoſed in an oven, whoſe heat is as near as can be that of an oven from which the bread is juſt drawn after being baked. After your cocons have remained therein near an hour, you muſt draw them out, and to ſee whether all the worms are dead, draw out a dupion from the

the middle of your baſket and open it, if the worm be dead, you may conclude all the reſt are ſo; becauſe the contexture of the dupion being ſtronger than that of the other cocons, it is conſequently leſs eaſy to be penetrated by the heat. You muſt obſerve to take it from the middle of the baſket, becauſe in that part the heat is leaſt perceptible; after you have drawn your baſkets from the oven, you muſt firſt cover each of them with a woolen blanket or rug, leaving the wrapper beſides, and then you pile them one on the other. If your baking has ſucceeded, your woolen cover will be all over wet with a kind of dew, the thickneſs of your little finger. If there be leſs, it is a ſign your cocons have been too much or too little baked. If too much baked, the worm being over dried, cannot tranſpire a humour he no longer contains, and your cocon is then burnt. If not enough baked, the worm has not been ſufficiently penetrated by the heat to diſtil the liquor he contains, and in that caſe is not dead.

You muſt let your baſkets ſtand thus covered five or ſix hours if poſſible, in order to keep in the heat, as this makes an end of ſtifling thoſe worms, which might have avoided the firſt impreſſion of the fire.

You are likewiſe to take great care to let your cocons ſtand in the oven the time that is neceſſary; for if they do not ſtand long enough your worm is only ſtunned for a time and will afterwards be revived. If on the other hand, you leave them too long in the oven you burn them, many inſtances of theſe two caſes are frequently to be met with.

It is a good ſign when you ſee ſome of the butterflies ſpring out from among the cocons which have been baked, becauſe you may be certain they are not burnt. For if you would kill them all to the laſt worm you would burn many cocons, which might be more expoſed to the heat than that particular worm.

III. When

III. When you put your cocons into the oven, you muſt be very careful in picking out all the ſpotted ones, otherwiſe they communicate their ſpots by the great perſpiration occaſioned in them by the heat. If you have a parcel of ſtrong and another of weak cocons, and you can only wind a part of them freſh (i. e. without baking) give the preference to the weak cocons, and bake your ſtrong ones, becauſe the latter, containing more gum, ſupport the baking much better and ſuffer leſs than the weak ones.

As faſt as the cocons you buy are brought in, put them in baſkets and expoſe them to the ſun, if it ſhines, in caſe your oven be full, in order at leaſt to ſtun the worm and prevent his working to pierce his cocon during that time.

It is very proper likewiſe that they be a little in the air before you put them in the oven; becauſe the peaſants bring them in baſkets heaped one on the other, which heats them and renders them extremely ſoft, but the air brings them to their proper tone again.

Sometimes the peaſants ſell you the cocons ready baked when they have been obliged to keep them ſometime. It is eaſy to know them, becauſe the worms when baked, being dry, make a louder noiſe on rattling them than when they are freſh.

When your cocons are fully baked, and have ſtood long enough, you muſt ſpread them half a foot thick on broad ozier ſhelves, which are diſtributed into as many ſtories as the height of the room will admit of, two or three feet diſtant one from the other; taking care to turn them every day, and to change their places, for otherwiſe there are many inconveniencies that would ariſe from ſuch a neglect. They would become mouldy and the moths would eat them. Beſides this, it is abſolutely neceſſary in order to ſeparate the ſpotted cocons, or the bad choquette, which would ſpread to all the cocons that are near them, and muſt be wound immediately to prevent their damaging any further.

The building where you ſpread your cocons is called the Coconiere, and conſiſts of one or more large rooms, in which are diſtributed as many ranges as you can conveniently place, taking care that the ſupporters touch neither the roof nor the wall, becauſe if there were any rats in the Coconiere they would come down the poles, and deſtroy the cocons, they being very greedy of the worm contained in them.

A middling cocon has about thirteen lines in its greater diameter, by eight lines the leſſer diameter, ſome are larger, ſome are ſmaller; but this is the general ſize. The dupion has generally fifteen lines great diameter by nine leſſer diameter.

The cocon is compoſed of ſeveral ſtrata or ſurfaces applied one on the other; notwithſtanding they all communicate, otherwiſe it would be impoſſible to wind them off. It is an eaſy matter to take off one or more of theſe ſurfaces, the uppermoſt of which is coarſer, leſs gummed, and higher coloured than the undermoſt. Finally, theſe ſurfaces are compoſed of a fine ſort of ſaliva, whoſe texture has a tolerable reſemblance to the thin ſkin you find joined to the inſide of a hen's egg.

The cocons produce a thread of a very unequal length, you may meet ſome that yield twelve hundred ells, whilſt others will ſcarcely afford two hundred ells. In general you may calculate the production of a cocon, from five hundred to ſix hundred ells in length.

IV. The worm or chryſalis, as he is incloſed in his cocon is ſhrunk up into himſelf, ſo that it is but half as long in his primitive ſtate, but it is on the contrary as thick again.

He is of a cinnamon colour, and full of liquor, rather clear, which forms the ſeed in the males, and the eggs in the females. Though he ſeems to be inſenſible in that ſtate, yet you may perceive he is not wholly ſo, for on piercing him with a pin ſlightly, you will ſee him move,

move, and we make uſe of theſe experiments to ſee if they have been killed in the oven.

The worm dries the older it grows, ſo that the ſame quantity, or the ſame number of cocons decreaſes daily in weight. The cocons which encloſe the male butterfly have more ſilk at the extremities, than thoſe which contain the females; but it is very difficult to perceive this difference, the moſt ſkilful connoiſſeurs will miſtake at leaſt twenty in a hundred.

When the worm wants to break his way through, he pierces the cocon, firſt wetting it a little in order to gnaw it the more eaſily; he has then only to ſtrip off his upper coat, under which he has another quite white, with wings.

When he comes out, his wings, which at firſt appear very ſmall, open and diſplay themſelves by little and little, and are entirely at liberty in an hour or two. As ſoon as born he ſeeks a female, and one would ſay he is born again merely to propagate his ſpecies, for he expires a very little time after having performed his function.

CHAP. III. *Of Cocons Royal, Perforated Cocons, and Soufflons.*

THE royal cocons are thoſe which you have kept for ſeed. The worm makes a hole in them for his paſſage, ſo that they cannot be wound, and are in the ſame claſs with the perforated cocons.

Neither can the ſoufflons be wound, becauſe their thread being the produce of a weak, ſick worm, it has not the gum it ought to contain. Beſides they cannot be wound off, their thread being interlaced and entangled.

The uſes you may make of theſe cocons are the following; and firſt for the

Soufflons; you muſt let them boil for about half an hour in common water, after which you muſt dry them. When they are quite dry you muſt threſh them on the

floor with a flail, to bring out the worm, which is reduced to aſhes by the fire and air. Afterwards you put them on a diſtaff and open them; to effect which you muſt take them by the two ends and ſtretch them out at arms length, you may then faſten them on your diſtaff.

2. The perforated cocons; you muſt obſerve the ſame method as for the ſoufflons, except that you muſt let them boil three-quarters inſtead of half an hour, becauſe they contain a greater quantity of gum.

3. The cocons royal. As it is natural to ſuppoſe you keep the flower of your cocons for ſeed; they are fuller of gum than the others, for which reaſon you muſt let them boil an hour; after which you muſt not threſh them as the former, becauſe they contain no worm, neither is it neceſſary to ſtay till they are quite dry before you ſpin them; on the contrary, they open more eaſily when damp. The produce of theſe three ſorts of cocons, when worked, makes what we call *fleuret*.

After you have boiled the cocons and threſhed them well, to ſhake out the worm they contain, you may card them inſtead of opening them as above, you will then make a much more beautiful fleuret, and of a brighter colour, but it will at the ſame time come conſiderably dearer, becauſe of the waſte in carding. A good ſpinſter performs a very reaſonable days work if ſhe can ſpin an ounce of fleuret.

To ſum up the whole, and give you a notion of the value of theſe three ſorts of cocons, you may calculate thus.

If the good cocons are worth one hundred, the perforated are worth thirty-three one third, the ſoufflons twenty-five, the royal cocons two hundred and fifty; but if your royal cocons are not choſen ones for ſeed, they are worth but two hundred.

The beſt fleuret is that which proceeds from the royal cocons, afterwards that of the perforated cocons unchoſen, laſt of all that of the ſoufflons.

CHAP. IV. *Of the Filature, or Winding from the Worm.*

Although the freſh cocons, that is to ſay, thoſe that have not been baked in the oven, yield a brighter ſilk than thoſe that have, and at the ſame time yield better weight, by reaſon of part of their gum which they have not loſt by the fire, yet moſt people prefer thoſe that are baked, in order to have a ſilk more even in its colour; unleſs you could have a conſiderable quantity of freſh cocons, and time to wind them ſo; for otherwiſe it is undeniable, that the freſh would be much more advantageous, as well for the reaſon above mentioned as becauſe they are eaſier to wind, not having been dried by the fire.

Before you begin to wind, you muſt prepare your cocons as follows.

1. In ſtripping them of that waſte ſilk that ſurrounds them, and which ſerved to faſten them to the twigs. This burr is proper to ſtuff quilts, or other ſuch uſes; you may likewiſe ſpin it to make ſtockings, but they will be coarſe and ordinary.

2. You muſt ſort your cocons, ſeparating them into different claſſes in order to wind them apart. Theſe claſſes are,

The good white cocons.
The good cocons of all the other colours.
The dupions.
The cocalons, among which are included the weak cocons.
The good choquette; and, laſtly,
The bad choquette.

In ſorting the cocons, you will always find ſome perforated cocons amongſt them, whoſe worm is already born; thoſe you muſt ſet apart for fleuret. As I have deſcribed above, you will likewiſe find ſome ſoufflons, but very few; for which reaſon you may put them among the bad choquette, and they run up into waſte.

The

The good cocons, as well white as yellow, are the eaſieſt to wind; thoſe which require the greateſt care and pains are the cocalons; you muſt wind them in cooler water than the others, and if you take care to give them to a good windſter, you will have as good ſilk from them as the reſt. You muſt likewiſe have careful windſters for the dupions and choquettes. Theſe two articles require hotter water than the common cocons.

The good cocons are to be wound in the following manner. Firſt chooſe an open convenient place for your filature, the longer the better, if you intend to have many furnaces and coppers. This building ſhould be high and open on one ſide and walled on the other, as well to ſcreen you from the cold winds and receive the ſun, as to give a free paſſage to the ſteam of your baſons or coppers.

Theſe coppers or baſons are to be diſpoſed (when the building will admit of it) in a row on each ſide of the filature, as being the moſt convenient method of placing them, for by that means in walking up and down you ſee what every one is about. And theſe baſons ſhould be two and two together, with a chimney between every couple.

Having prepared your reels, (which are turned by hands and require a quick eye) and your fire being a light one under every baſon, your windſter muſt ſtay till the water is as hot as it can be without boiling. When every thing is now ready, you throw into your baſons two or three handsful of cocons, which you gently bruſh over with a wiſk about ſix inches long, cut ſtumpy like a broom worn out: by theſe means the threads of the cocons ſtick to the wiſk. You muſt diſengage theſe threads from the wiſk, and purge them by drawing theſe ends with your fingers till they come off entirely clean. This operation is called la Battüe.

When the threads are quite clear, you muſt paſs four of them (if you will wind fine ſilk) through each of the holes in a thin iron bar that is placed horizontally at the edge

edge of your baſon; afterwards you twiſt the two ends (which conſiſt of four cocons each) twenty or twenty-five times, that the four ends in each thread may the better join together in croſſing one another, and that your ſilk may be plump, which otherwiſe would be flat.

Your windſter muſt always have a bowl of cold water by her, to dip her fingers in, and to ſprinkle very often the ſaid bar, that the heat may not burn the thread.

Your threads, when thus twiſted, go upon two iron hooks called rampins, which are placed higher, and from thence they go upon the reel. Now at one end of the axis of the reel is a cog-wheel, which catching in the teeth of the poſt-rampin, moves it from the right to the left, and conſequently the thread that is upon it; ſo that your ſilk is wound on the reel croſs-ways, and your threads form two hanks of about four fingers broad.

As often as the cocons you wind are done, or break or diminiſh only, you muſt join freſh ones to keep up the number requiſite, or the proportion; I ſay the proportion, becauſe as the cocons wind off, the thread being finer, you muſt join two cocons half wound to replace a new one: Thus you may wind three new ones and two half wound, and your ſilk is from four to five cocons.

When you would join a freſh thread, you muſt lay one end on your finger, which you throw lightly on the other threads that are winding, and it joins them immediately, and continues to go up with the reſt. You muſt not wind off your cocons too bare or to the laſt, becauſe when they are near at an end, the bairré, as we call it, that is the huſk, joins in with the other threads and makes the ſilk foul and gouty.

When you have finiſhed your firſt parcel, you muſt clean your baſons, taking out all the ſtriped worms, as well as the cocons, on which there is a little ſilk, which you firſt open and take out the worm and then throw them into a baſket by you, into which you likewiſe caſt the looſe ſilk that comes off in making the battüe. You

You then proceed, as before, with other two or three handsful of cocons; you make a new battiie; you purge them, and continue to wind the ſame number of cocons or their equivalent, and ſo to the end.

As I ſaid above, your windſter muſt always have a bowl of cold water by her, to ſprinkle the bar, to cool her fingers every time ſhe dips them in the hot water, and to pour into her baſon when neceſſary, that is, when her water begins to boil. You muſt be very careful to twiſt your threads a ſufficient number of times, about twenty-five, otherwiſe your ſilk remains flat, inſtead of being round and full; beſides when the ſilk is not well croſſed it never can be clean, becauſe a gout or nub that comes from a cocon will paſs through a ſmall number of theſe twiſts, though a greater will ſtop it. Your thread then breaks and you paſs what foulneſs there may be in the middle of your reel, between the two hanks, which ſerves for a head band to tie them.

You muſt mind your water be juſt in a proper degree of heat. When it is too hot the thread is dead and has no body; when it is too cold, the ends which form the thread do not join well, and form a harſh ill-qualified ſilk.

You muſt change the water in your baſon four times a day, for your dupions and choquette, and twice only for good cocons when you wind fine ſilk, but if you wind coarſe ſilk it is neceſſary to change it three or four times. For if you was not to change the water the ſilk would not be ſo bright and gloſſy, becauſe the worm contained in the cocons foul it very conſiderably. You muſt endeavour as much as poſſible to wind with clear water, for if there are too many worms in it, your ſilk is covered with a kind of duſt, which attracts the moth and deſtroys your ſilk.

You may wind your ſilk of what ſize you pleaſe, from one cocon to a thouſand; but it is difficult to wind more than thirty in a thread. The nicety, and that in which conſiſts

conſiſts the greateſt difficulty, is to wind even, becauſe as the cocon winds off, the end is finer, and you muſt then join other cocons to keep up the ſame ſize. This difficulty of keeping the ſilk always even is ſo great, that (excepting a thread of two cocons, which we call ſuch) we do not ſay a ſilk of three, of four, or of ſix cocons, but a ſilk of three to four, of four to five, of ſix to ſeven cocons. If you proceed to a coarſer ſilk you cannot calculate ſo nicely as to one cocon more or leſs. We ſay for example, from twelve to fifteen, from fifteen to twenty, and ſo on.

It is eaſy to conceive, that it is more difficult to wind a coarſe ſilk even, than a fine one, becauſe it is harder to keep a great number of cocons always to the ſame ſize, than a ſmall one.

The dupions which you deſign for rondelette, or ordinary ſewing ſilk, are to be wound from fifteen to twenty. The reſt you may wind as coarſe as poſſible, i. e. from forty to fifty: they ſerve to cover and fill up in coarſe ſtuffs, and may likewiſe be uſed for ſome ſort of ſewing ſilk.

The good choquette is to be wound according to the uſes to which you intend to apply it; however not finer than from ſeven to eight. The bad choquette you may wind from fifteen to twenty cocons.

In winding the good cocons, you will always meet with ſome defective, which will not wind off, or are full of gouts and nubs. Theſe you muſt take out of your baſon and keep by themſelves. They are called *baſſinats*. They are to be wound apart as coarſe as you can. They make a foul, dirty ſilk. To have a good ſilk, you muſt wind in fine weather. If the wind be high it ſhakes your ſilk, and prevents its lying ſmooth on the reel, forms ſtrings of threads, which make it very difficult to wind on bobbins. If the weather is rainy the ſilk is damp, and has not that luſtre it ought to have, or which it has when it dries, as it goes upon the reel. You muſt mind not to hank it when damp, but let it dry on the reel; otherwiſe it would be furzy.

I have now only to ſpeak of the waſte that comes from the battüe, and the huſks of the cocons, that have ſtill ſome ſilk upon them, which are thrown into baſkets in winding, and are what we call *moreſques*. Theſe you firſt dry in the ſun, then threſh, and afterwards card and ſpin them to make fleuret. One hundred and fifty ounces of good cocons yield about eleven ounces of ſilk from five to ſix cocons; if you wind coarſer, ſomething more. You may wind about eleven or twelve ounces of ſilk from five to ſix cocons in fourteen hours.

The ſilk which is made of baſſinats and bad choquette ſerves to make ſtockings and coarſe heavy ſtuffs, ſuch as ſattinades and damaſks for hangings, &c. &c.

N° XLII.

The Art of making Anatomical Preparations by Corroſion. By JOHN MORGAN, *M. D. Profeſſor of the Theory and Practice of Phyſic in the Univerſity of Pennſylvania, Member of the Royal College of Phyſicians at Edinburgh, and F. R. S. at London, &c.*

AS no branch of ſcience more certainly leads to an intimate acquaintance with the functions of the animal body, (which is the foundation of all rational knowledge of the cauſes and cure of diſeaſes) than that of the ſtructure of the vaſcular ſyſtem, the origin, diviſions, different ramifications and numerous inoſculations of the veſſels into, and their communication with each other, I have always thought this field of uſeful information deſerved to be cultivated with great induſtry and attention. In effect it brings us immediately, and in the moſt compendious way, to acquire a knowledge of the nature, and of the motions of the fluids which circulate through them, of their diſtribution throughout the different parts of the body,